

# Основы интерфейса взаимодействия пользователя с системой Unix на уровне командной строки

---

Суннатилло Махмудов<sup>1</sup>

10 марта, 2024, Москва, Россия

<sup>1</sup>Российский Университет Дружбы Народов

# Цели и задачи работы

---

# Цель лабораторной работы

Приобретение практических навыков взаимодействия пользователя с системой посредством командной строки.

# Задачи лабораторной работы

- 1 Определить имя и путь домашнего каталога
- 2 Изучить команду `ls`.
- 3 Выполнить действия с каталогами.
- 4 Получить дополнительные сведения при помощи справки по командам.
- 5 Изучить команду `history`.

# **Процесс выполнения лабораторной работы**

---

# Имя и путь к домашнему каталогу

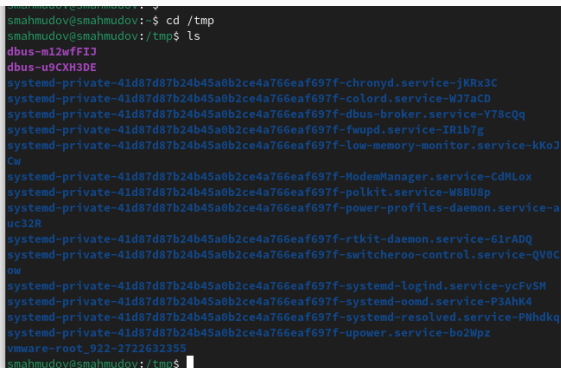


```
smahmudov@smahmudov:~$ cd
smahmudov@smahmudov:~$ pwd
/home/smahmudov
smahmudov@smahmudov:~$
```

A terminal window with a dark background. The title bar shows a plus icon in a square and the text "smahmudov@smahmudov:~". The terminal content shows a user running the 'cd' command, then the 'pwd' command, which outputs "/home/smahmudov". The prompt returns to "smahmudov@smahmudov:~\$".

Рис. 1: Путь к домашнему каталогу

# Опции команды ls

A terminal window with a dark background and light-colored text. The prompt is 'smahmudov@smahmudov:~\$'. The user enters 'cd /tmp' and then 'ls'. The output is a long list of files and directories, including 'dbus-m12wfFIJ', 'dbus-u9CXH3DE', and several 'systemd-private' directories with long UUIDs. The prompt returns to 'smahmudov@smahmudov: /tmp\$' at the bottom.

```
smahmudov@smahmudov:~$ cd /tmp
smahmudov@smahmudov: /tmp$ ls
dbus-m12wfFIJ
dbus-u9CXH3DE
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-chrond.service-jKRx3C
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-colord.service-WJ7aCD
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-dbus-broker.service-Y78cQq
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-fwupd.service-IR1b7g
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-low-memory-monitor.service-kKoJ
Cw
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-ModemManager.service-CdMLox
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-polkit.service-W8BU8p
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-power-profiles-daemon.service-a
uc32R
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-rtkit-daemon.service-61rADQ
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-switcheroo-control.service-QV0C
ow
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-logind.service-ycFvSM
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-oomd.service-P3AhK4
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-resolved.service-PNhdkq
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-upower.service-bo2Wpz
vmware-root_922-2722632355
smahmudov@smahmudov: /tmp$
```

Рис. 2: Команда ls

# Опции команды ls

```
smahmudov@smahmudov:~$ cp -r /tmp/ls -a
smahmudov@smahmudov:/tmp$ ls -a
.
..
dbus-m12wfFIJ
dbus-u9CXH3DE
.font-unix
.ICE-unix
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-chronyd.service-jKRx3C
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-colord.service-WJ7aCd
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-dbus-broker.service-Y78cQq
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-fwupd.service-IR1b7g
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-low-memory-monitor.service-kK0JCw
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-ModemManager.service-CdMLox
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-polkit.service-W8BU8p
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-power-profiles-daemon.service-auc32R
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-rtkit-daemon.service-61rADQ
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-switcheroo-control.service-QV0Cow
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-logind.service-ycFvSM
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-oomd.service-P3AhK4
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-resolved.service-PHhdkq
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-upower.service-bo2Wpz
vmware-root_922-2722632355
.X0-lock
.X1024-lock
.X1025-lock
.X11-unix
```

Рис. 3: Команда ls -a



# Опции команды ls

```
ssh@hadoopvpsnshadov: /tmp$ ls -l
total 0
srwx-rw-rw-. 1 root root 0 map 10 14:05 dbus-ml2uffII
srwx-rw-rw-. 1 root root 0 map 10 14:05 dbus-u9CKN3DE
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-chromyd.service-jKRx3C
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-colord.service-W3TaCB
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-dbus-broker.service-Y78cQq
drwx----- 3 root root 60 map 10 14:33 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-fwupd.service-IR1b7g
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-low-memory-monitor.service-kKo3Cw
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-moumoumanger.service-CDRLex
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-polkit.service-W080Up
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-power-profiles-daemon.service-auc32R
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-rtkit-daemon.service-61rADQ
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-switcheroo-control.service-QV0Cw
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-systemd-logind.service-ycfv5H
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-systemd-oom.service-P3AHR4
drwx----- 3 root root 60 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-systemd-resolved.service-PWbdkq
drwx----- 2 root root 40 map 10 14:05 systemd-private-41d07d07b24b45a0b2ce4a766eaf697ff-upower.service-bo2Mpz
drwx----- 2 root root 40 map 10 14:05 vmware-root_932-2722632353
ssh@hadoopvpsnshadov: /tmp$
```

Рис. 4: Команда ls -l

# Опции команды ls

```
smahmudov@smahmudov:/tmp$ ls -f
..
.
.X11-unix
.ICE-unix
.XIM-unix
.font-unix
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-oomd.service-P3AhK4
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-resolved.service-PNhdKq
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-dbus-broker.service-Y78cQq
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-chronyd.service-jKRx3C
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-low-memory-monitor.service-kKoJCw
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-polkit.service-W8BU8p
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-power-profiles-daemon.service-auc32R
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-rtkit-daemon.service-61rADQ
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-switcheroo-control.service-QV0Cow
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-systemd-logind.service-ycFvSM
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-upower.service-bo2Wpz
vmware-root_922-2722632355
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-ModemManager.service-CdMLox
dbus-u9CXH3DE
dbus-m12wFFI3
.X1024-lock
.X1025-lock
systemd-private-41d87d87b24b45a0b2ce4a766eaf697f-colord.service-WJ7aCD
.X0-lock
```

Рис. 5: Команда ls -f

```
smahmudov@smahmudov:/tmp$  
smahmudov@smahmudov:/tmp$ cd /var/spool/  
smahmudov@smahmudov:/var/spool$ ls -l  
итого 0  
drwxr-x--x. 1 root abrt 1510 мар 10 12:45 abrt  
drwx----- 1 abrt abrt 0 июл 19 2023 abrt-upload  
drwx--x--- 1 root lp 6 фев 16 03:00 cups  
drwxr-xr-x. 1 root root 0 июл 21 2023 lpd  
drwxrwxr-x. 1 root mail 1222 мар 8 17:40 mail  
drwxr-xr-x. 1 root root 0 июл 21 2023 plymouth  
smahmudov@smahmudov:/var/spool$
```

Рис. 6: Каталог /var/spool

```
snahmudov@snahmudov: /var/spool$ cd
snahmudov@snahmudov: /var/spool$ ls
git-extended  work  Видео  Документы  Загрузки  Изображения  Музыка  Общедоступные  'Рабочий стол'  Шаблоны
snahmudov@snahmudov: /var/spool$ ls -al
итого 20
drwx----- 1 snahmudov snahmudov 498 мар  4 12:54 .
drwxr-xr-x  1 root      root      1216 мар  8 17:40 ..
-rw----- 1 snahmudov snahmudov 263 мар  4 12:54 .bash_history
-rw-r--r-- 1 snahmudov snahmudov 18 июл 19 2023 .bash_logout
-rw-r--r-- 1 snahmudov snahmudov 144 июл 19 2023 .bash_profile
-rw-r--r-- 1 snahmudov snahmudov 679 мар  4 12:43 .bashrc
drwx----- 1 snahmudov snahmudov 452 мар 10 14:33 .cache
drwx----- 1 snahmudov snahmudov 402 мар  4 12:45 .config
-rw-r--r-- 1 snahmudov snahmudov 233 мар  4 12:54 .gitconfig
drwxr-xr-x  1 snahmudov snahmudov 74 мар  4 12:48 git-extended
drwx----- 1 snahmudov snahmudov 136 фев 27 14:46 .gnupg
drwx----- 1 snahmudov snahmudov 20 фев 27 14:37 .local
drwxr-xr-x  1 snahmudov snahmudov 48 фев 27 14:41 .mozilla
drwx----- 1 snahmudov snahmudov 132 фев 27 14:48 .ssh
drwxr-xr-x  1 snahmudov snahmudov 10 фев 27 14:48 work
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 Видео
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 Документы
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 Загрузки
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 Изображения
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 Музыка
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 Общедоступные
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 'Рабочий стол'
drwxr-xr-x  1 snahmudov snahmudov 0 фев 27 14:37 Шаблоны
snahmudov@snahmudov: /var/spool$
```

Рис. 7: Файлы в домашнем каталоге

```
snahmudov@snahmudov:~$ mkdir newdir
snahmudov@snahmudov:~$ mkdir newdir/morefun
snahmudov@snahmudov:~$ mkdir letters memos misk
snahmudov@snahmudov:~$ ls
git-extended  memos  newdir  Видео  Загрузки  Музыка  'Рабочий стол'
letters       misk   work    Документы  Изображения  Общедоступные  Шаблоны
snahmudov@snahmudov:~$ rm letters/ memos misk/
rm: невозможно удалить 'letters/': Это каталог
rm: невозможно удалить 'memos/': Это каталог
rm: невозможно удалить 'misk/': Это каталог
snahmudov@snahmudov:~$ rm -r letters/ memos/ misk/
snahmudov@snahmudov:~$ rm -r newdir/
snahmudov@snahmudov:~$ ls
git-extended  work  Видео  Документы  Загрузки  Изображения  Музыка  Общедоступные  'Рабочий стол'  Шаблоны
snahmudov@snahmudov:~$
```

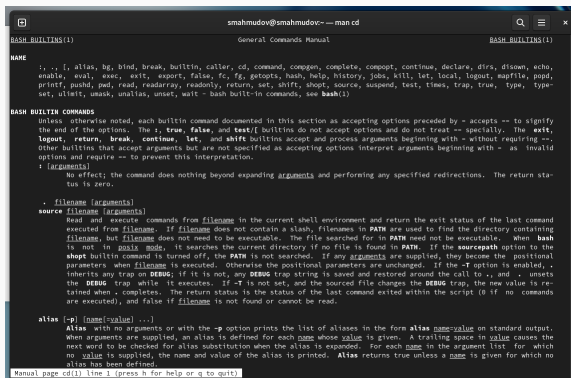
Рис. 8: Действия с каталогами

# Опции команды ls

```
"/work/study/2023-2024/Операционные системы/os-Intro/template/report/scripts":  
image-report mpv-shot  
  
./Видео:  
./Документы:  
./Загрузки:  
./Изображения:  
./Музыка:  
./Общедоступные:  
"/Рабочий стол":  
./Шаблоны:  
smahtudov@smahtudov:~$ ls -lt  
git-extended work Видео Документы Загрузки Изображения Музыка Общедоступные Шаблоны "Рабочий стол"  
smahtudov@smahtudov:~$
```

Рис. 9: Команда ls -R и ls -t

# Справка по командам



```
smahmudov@smahmudov:~ — man cd
BASH_BUILTINS(1)                                General Commands Manual                                BASH_BUILTINS(1)

NAME
: .. [, alias, bg, bind, break, builtin, caller, cd, command, compgen, complete, continue, declare, dirs, disown, echo,
enable, eval, exec, exit, export, false, fg, fg, getopts, hash, help, history, jobs, kill, let, local, logout, mapfile, popd,
printf, pushd, pwd, read, readdir, readonly, return, set, shift, shoot, source, suspend, test, times, trap, true, type, type-
set, ulimit, unset, unalias, unset, wait - bash built-in commands, see bash(1)

BASH BUILTIN COMMANDS
Unless otherwise noted, each builtin command documented in this section as accepting options preceded by - accepts -- to signify
the end of the options. The y, true, false, and test if builtins do not accept options and do not treat -- specially. The exit,
logout, return, break, continue, let, and shift builtins accept and process arguments beginning with - without requiring --.
Other builtins that accept arguments but are not specified as accepting options interpret arguments beginning with - as invalid
options and require -- to prevent this interpretation.
: [arguments]
No effect; the command does nothing beyond expanding arguments and performing any specified redirections. The return status
is zero.

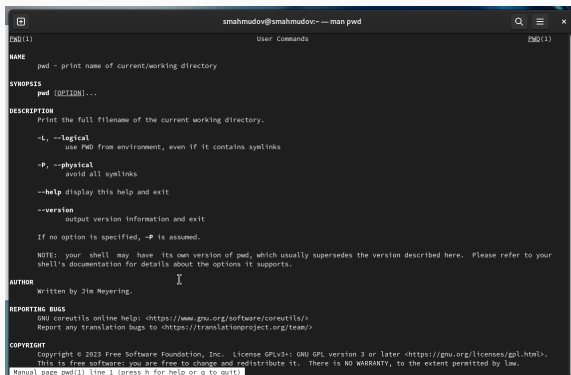
. filename [arguments]
source filename [arguments]
Read and execute commands from filename in the current shell environment and return the exit status of the last command
executed from filename. If filename does not contain a slash, filenames in PATH are used to find the directory containing
filename, but filename does not need to be executable. The file searched for in PATH need not be executable. When bash
is not in posix mode, it searches the current directory if no file is found in PATH. If the sourcepath option to the
shopt builtin command is turned off, the PATH is not searched. If any arguments are supplied, they become the positional
parameters when filename is executed. Otherwise the positional parameters are unchanged. If the -T option is enabled, .
inherits any trap on DEBUG; if it is not, any DEBUG trap string is saved and restored around the call to ., and . unsets
the DEBUG trap while it executes. If -T is not set, and the sourced file changes the DEBUG trap, the new value is re-
tained when . completes. The return status is the status of the last command exited within the script (0 if no commands
are executed), and false if filename is not found or cannot be read.

alias [-p] [name=value ...]
Alias with no arguments or with the -p option prints the list of aliases in the form alias name=value on standard output.
When arguments are supplied, an alias is defined for each name whose value is given. A trailing space in value causes the
next word to be checked for alias substitution when the alias is expanded. For each name in the argument list for which
no value is supplied, the name and value of the alias is printed. Alias returns true unless a name is given for which no
alias has been defined.

Manual page cd(1) line 1 (press h for help or q to quit)
```

Рис. 10: Справка по команде cd

# Справка по командам



```
smahmudov@smahmudov:~$ man pwd
pwd(1)                                User Commands                                pwd(1)

NAME
  pwd - print name of current/working directory

SYNOPSIS
  pwd [OPTION]...

DESCRIPTION
  Print the full filename of the current working directory.

  -L, --logical
      use PWD from environment, even if it contains symlinks

  -P, --physical
      avoid all symlinks

  --help
      display this help and exit

  --version
      output version information and exit

  If no option is specified, -P is assumed.

NOTE: your shell may have its own version of pwd, which usually supersedes the version described here. Please refer to your shell's documentation for details about the options it supports.

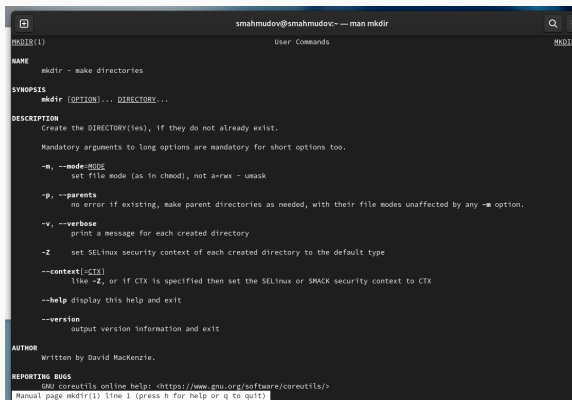
AUTHOR
  Written by Jim Meyering.

REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Report any translation bugs to <https://translationproject.org/team/>

COPYRIGHT
  Copyright © 2023 Free Software Foundation, Inc. License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
  This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law.
  Manual page pwd(1) line 1 (press h for help or q to quit)
```

Рис. 11: Справка по команде pwd





```
smahmudov@smahmudov:~$ man mkdir
mkdir(1)                                User Commands
NAME
  mkdir - make directories

SYNOPSIS
  mkdir [OPTION]... DIRECTORY...

DESCRIPTION
  Create the DIRECTORY(ies), if they do not already exist.

  Mandatory arguments to long options are mandatory for short options too.

  -m, --mode=MODE
      set file mode (as in chmod), not a-rwx - umask

  -p, --parents
      no error if existing, make parent directories as needed, with their file modes unaffected by any -m option.

  -v, --verbose
      print a message for each created directory

  -Z
      set SELinux security context of each created directory to the default type

  --context=CTX
      like -Z, or if CTX is specified then set the SELinux or SMACK security context to CTX

  --help
      display this help and exit

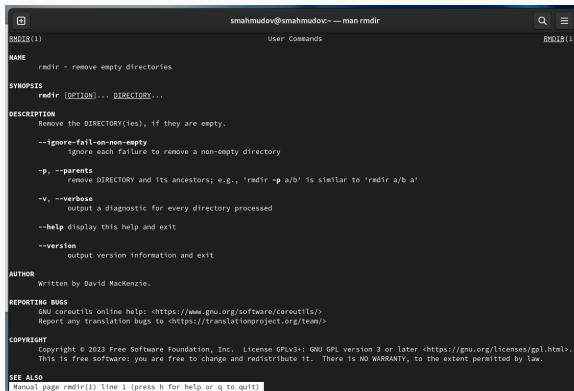
  --version
      output version information and exit

AUTHOR
  Written by David MacKenzie.

REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Manual page mkdir(1) line 1 (press h for help or q to quit)
```

Рис. 12: Справка по команде mkdir

# Справка по командам



```
smahmudov@smahmudov:~ -- man rmdir
rmdir(1)                                User Commands                                rmdir(1)

NAME
  rmdir - remove empty directories

SYNOPSIS
  rmdir [OPTION]... DIRECTORY...

DESCRIPTION
  Remove the DIRECTORY(ies), if they are empty.

  --ignore-fail-on-non-empty
      ignore each failure to remove a non-empty directory

  -p, --parents
      remove DIRECTORY and its ancestors; e.g., 'rmdir -p a/b' is similar to 'rmdir a/b a'

  -v, --verbose
      output a diagnostic for every directory processed

  --help
      display this help and exit

  --version
      output version information and exit

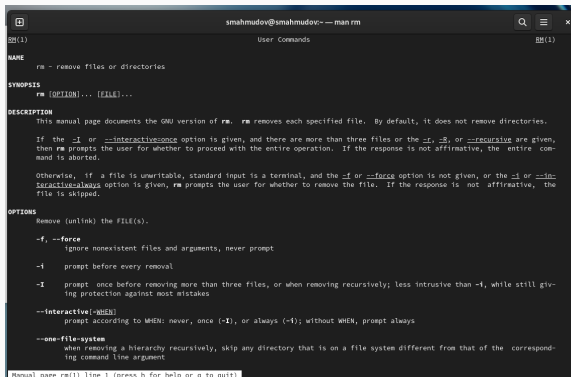
AUTHOR
  Written by David MacKenzie.

REPORTING BUGS
  GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
  Report any translation bugs to <https://translationproject.org/team/>

COPYRIGHT
  Copyright © 2023 Free Software Foundation, Inc. License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
  This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law.

SEE ALSO
  Manual page rmdir(1) line 1 (press h for help or q to quit)
```

Рис. 13: Справка по команде rmdir



```
smahmudov@smahmudov:~ -- man rm
rm(1)                                User Commands
NAME
rm - remove files or directories

SYNOPSIS
rm [OPTION]... [FILE]...

DESCRIPTION
This manual page documents the GNU version of rm. rm removes each specified file. By default, it does not remove directories.

If the -I or --interactive option is given, and there are more than three files or the -r, -R, or --recursive are given, then rm prompts the user for whether to proceed with the entire operation. If the response is not affirmative, the entire command is aborted.

Otherwise, if a file is unwritable, standard input is a terminal, and the -f or --force option is not given, or the -i or --interactive option is given, rm prompts the user for whether to remove the file. If the response is not affirmative, the file is skipped.

OPTIONS
Remove (unlink) the FILE(s).

-f, --force
    ignore nonexistent files and arguments, never prompt

-i
    prompt before every removal

-I
    prompt once before removing more than three files, or when removing recursively; less intrusive than -i, while still giving protection against most mistakes

--interactive[=WHEN]
    prompt according to WHEN: never, once (-I), or always (-i); without WHEN, prompt always

--one-file-system
    when removing a hierarchy recursively, skip any directory that is on a file system different from that of the corresponding command line argument

Manual page rm(1) line 1 (press h for help or q to quit)
```

Рис. 14: Справка по команде rm

# История командной строки

```
27 ls
28 ls -al
29 mkdir newdir
30 mkdir newdir/morefun
31 mkdir letters memos misk
32 ls
33 rm letters/ memos misk/
34 rm -r letters/ memos/ misk/
35 rm -r newdir/
36 ls
37 ls -R
38 ls -t
39 man cd
40 man pwd
41 man mkdir
42 man rmdir
43 man rm
44 history
smahmudov@smahmudov:~$
```

Рис. 15: Команда history

## **Выводы по проделанной работе**

---

Мы приобрели практические навыки взаимодействия пользователя с системой посредством командной строки.